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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,741	10/04/2000	Tadahiro Ohmi	PM 274025 EL00009CDC	9698

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EXAMINER
CROWELL, ANNA M

ART UNIT	PAPER NUMBER
1763	15

DATE MAILED: 06/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N.	Applicant(s)	
	09/678,741	OHMI ET AL.	
	Examiner	Art Unit	
	Michelle Crowell	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *9-12* is/are withdrawn from consideration.

5)☒ Claim(s) *13-20* is/are allowed.

6)☒ Claim(s) *1-3* is/are rejected.

7)☒ Claim(s) *4-8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *14* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Currently, there are no generic claims.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 5, 2003 has been entered.

Claim Objections

3. Claim 4 is objected to because of the following informalities: In line 1, the claim recites the limitation, "said lattice-like shower plate". Claim 1 was amended to recite "latitice-like shower head". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 5, 6, 17, and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Lines 2-5 of claim 5 recites the limitation, "a distance between a surface of said dielectric material plate facing said slot antenna and a surface of said substrate is substantially equal to an odd multiple of a quarter of a wavelength of said microwave in a corresponding part". There is no support for this limitation. On page 14, lines 24-29 of the specification, the specification supports a "distance between a surface of said dielectric material plate facing said slot antenna and a **surface of the dielectric material shower plate facing** the substrate is substantially equal to an odd multiple of a quarter of a wavelength of said microwave in a corresponding part".

Lines 26-29 of claim 17 recites the limitation, "a distance between a surface of said dielectric material plate facing said slot antenna and a surface of said substrate is substantially equal to an odd multiple of a quarter of a wavelength of said microwave in a corresponding part". There is no support for this limitation. On page 14, lines 24-29 of the specification, the specification supports a "distance between a surface of said dielectric material plate facing said slot antenna and a **surface of the dielectric material shower plate facing** the substrate is substantially equal to an odd multiple of a quarter of a wavelength of said microwave in a corresponding part"

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 1, 4, 6, 7, 8, 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuka et al. (Japanese Patent Publication 06-061153A) in view of Hama et al (U.S. 5,525,159), and Oyama (Japanese Patent Publication 02-237020).

Referring to Drawing 1 and paragraph [0007], Tetsuka discloses a plasma processing apparatus comprising a chamber (vacuum housing 2) of which interior can be depressurized, a gas supply system (gas inlet 5) constructed and arranged to supply a gas to the chamber and an exhaust system configured and arranged to exhaust the gas supplied to the chamber and to depressurize the chamber; a part of a wall constituting the chamber being a flat plate dielectric material plate (dielectric plate 3) formed of a material which passes a material which passes a

microwave therethrough substantially without loss; a flat plate dielectric material shower plate (dielectric gas-evolution board 7), which is formed of a material which passes a microwave therethrough substantially without a loss, being provided between the dielectric material plate and plasma 6 and includes a plurality of gas discharge holes; a flat plate slot antenna 1 being provided on an outer side of the chamber with the dielectric material plate interposed therebetween so as to supply a microwave for exciting plasma through the dielectric material plate; and an electrode (substrate electrode holder 9) being provided on an inner side of the chamber so as to hold the substrate to be processed.

Tetsuka fails to teach a lattice–like shower head formed of a metal pipe with holes oblique to the surface of the substrate.

Referring to Figures 1 and 2, column 5, line 4 – column 6, line 26, and column 9, lines 41-59, Hama teaches a plasma processing apparatus comprising two gas distribution inlets 86 and 66. The two gas distribution inlets 82 and 62 allow different gases to be supplied to the chamber at different locations. In addition, a gas distribution inlet 152 includes a lattice-like shower head (vertical pipe lattice 156) provided between the dielectric material shower inlet 82 and the substrate S to be processed so as to discharge a gas, which has a composition different from that of the gas discharged from the dielectric material shower inlet, to a side of the substrate to be processed; at least a part of the gas discharged from the dielectric material shower inlet flows to the side of the substrate to be processed by being passed through an opening part of the lattice-like shower head. Moreover, the lattice-like shower head is formed of pipe comprising a plurality of gas discharge holes 154 which allows gases to fully and uniformly cover the entire process region of the substrate. Thus, it would have been obvious to one of ordinary skill in the

art at the time of the invention to provide the apparatus of Tetsuka with the lattice-like shower head as taught by Hama. This would provide additional gases to the process chamber at different locations and the lattice-like shower head would fully and uniformly cover the entire process region of the substrate.

Referring to Drawings 1 and 4, and the abstract, Oyama teaches a metal showerhead 14 which has gas discharge holes 15 oblique to the surface of the substrate (a wafer 13). The holes are inclined towards the center of the wafer 13 to obtain a uniform film. The metal showerhead is made of stainless steel, which is an excellent material used for corrosion resistance. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the metal lattice-like showerhead of Tetsuka in view of Hama with gas holes of Oyama. When the gas holes are inclined, a uniform film is formed on the wafer. In addition, stainless steel is an excellent metal for corrosion resistance.

Regarding claims 4-8, and 13-20, Tetsuka in view of Hama, and Oyama fails to expressly disclose a distance between a dielectric material shower plate and a lattice-like shower plate, a distance between a dielectric material plate and a dielectric material shower plate, a distance between a slot antenna and a dielectric material plate, and a thickness of a dielectric material shower plate. However, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the distance and the thickness during routine experimentation in absence of a showing of criticality. Furthermore, where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform

differently than the prior art device, then the claimed device is not patentably distinct from the prior art device.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuka et al. (Japanese Patent Publication 06-061153A) in view of Hama et al (U.S. 5,525,159), and Oyama (Japanese Patent Publication 02-237020), as applied to claims 1, 4, 5, 6, 7, 8, and 13-20 above, and further in view of Otani et al. (Japanese Patent Publication 06-260434).

The teachings of Tetsuka in view of Hama, and Oyama have been discussed above.

Tetsuka in view of Hama, and Oyama fail to teach that the pipe is grounded.

Referring to Drawing 1 and paragraphs [0024]-[0025], Otani teaches a plasma processing apparatus including a lattice-like shower head (the bipolar electrode 30) which can be grounded. This would prevent a person handling the lattice-like shower head from being electrically shocked. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to ground the pipe as taught by Otani. This would prevent a person handling the lattice-like shower head from being electrically shocked.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuka et al. (Japanese Patent Publication 06-061153A) in view of Hama et al (U.S. 5,525,159), Oyama (Japanese Patent Publication 02-237020), and Otani et al. (Japanese Patent Publication 06-260434) as applied to claim 2 above, and further in view of Omi et al. (Japanese Patent Publication 11-302824).

The teachings of Tetsuka in view of Hama, Oyama, and Otani are discussed above.

Tetsuka in view of Hama, Oyama, and Otani fails to teach a stainless steel metal pipe containing aluminum with an aluminum oxide layer.

11. Referring to the abstract, Omi teaches a method of forming a passivated film of aluminum oxide on the surface of stainless steel containing aluminum pipes. The passivated film made of aluminum oxide is used to protect the metal pipes from corrosion. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lattice shower plate of Tetsuka in view of Hama, Oyama, and Otani with the passivated aluminum oxide coated metal pipes as taught by Omi. This would provide excellent corrosion resistance at a low price. any intervening claims.

Response to Arguments

12. Applicant's arguments filed March 5, 2003 have been fully considered but they are not persuasive.

> **Applicant argues that Oyama et al. does not provide a lattice-like shower head having an opening part wherein at least a part of the gas discharged from a dielectric material shower plate flows through to the side of the substrate. Additionally, applicant argues that the holes in the shower plate in Oyama are simply provided on a shower plate which corresponds to the dielectric material shower plate of the present invention.**

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Tetsuka in view of Hama teaches the lattice-like shower head having an opening part and a dielectric material shower plate.

Oyama was simply used to teach that it is known to provide holes to a gas inlet that are oblique to the surface of the substrate.

Applicant argues that Oyama's holes are normal to the wafer at least at the center of Oyama's showerhead.

The claimed invention only requires a plurality of gas discharge holes such that a normal to each of the holes is oblique to the surface of the substrate, therefore Tetsuka in view of Hama and Oyama satisfies this claimed configuration.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC
May 29, 2003

Luz L. Alejandro
Primary Examiner
Art Unit 1763